

CLAIMS

1. An apparatus for reducing the liquid content of a material comprising a particulate/liquid dispersion or suspension, the apparatus comprising a receiving zone to contain the material, at least one pair of electrodes spaced apart within the receiving zone, means to apply a potential difference thereacross and hence across the material in use to drive electro-kinetic dewatering, and drainage means to enable removal of water, wherein at least one of the electrodes comprises a textile or other synthetic material at least in part associated with a conductor so as to constitute where so associated a conducting electrokinetic textile or other synthetic material.
- 15 2. An apparatus in accordance with claim 1 for reducing the liquid content of a material comprising a dispersion or suspension of inorganic particles being a byproduct of mining, manufacturing or other industrial processes.
- 20 3. An apparatus in accordance with claim 1 or 2 wherein the second electrode is also a conducting electrokinetic textile or other synthetic material.
- 25 4. An apparatus in accordance with any preceding claim wherein the drain is formed as an integral structure with the conducting electrokinetic textile or other synthetic material electrode.
5. An apparatus in accordance with claim 4 wherein the receiving zone is at least partly defined by a filtration membrane permeable to the liquid but

impermeable to at least some and more preferably substantially all of the particulate solids contained within the material, which filtration membrane comprises a textile or other synthetic material at least in part associated with a conductor so as to constitute where so associated the 5 said conducting electrokinetic textile or other synthetic electrode.

6. An apparatus in accordance with claim 5 wherein the filter membrane is a sheet-like material having a primarily polymeric base structure.

10 7. An apparatus in accordance with claim 6 wherein the filter membrane includes conducting elements in a composite material composition.

15 8. An apparatus in accordance with one of claims 5 to 7 provided with a separate conductor so disposed within the apparatus as to be caused during use to come into contact with the filtration membrane material over at least a part of the area thereof.

20 9. An apparatus in accordance with one of claims 5 to 7 wherein the electrode is at least partly comprised of a conductor, either in that the material is inherently conducting or in that it integrally incorporates conductive material into its structure.

10. An apparatus in accordance with claim 9 wherein the electrode comprises a conducting geosynthetic material.

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11. An apparatus in accordance with claim 10 wherein the electrode comprises a generally inherently non-conductive geosynthetic material in association with at least one metallic or non-metallic conducting element to produce a composite conducting geosynthetic material.

12. An apparatus in accordance with claim 11 wherein the electrokinetic material comprises a woven or non-woven polymeric material incorporating a plurality of elongate conducting elements therewithin, in particular in one or more parallel arrays.
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13. An apparatus in accordance with claim 11 or 12 wherein a conducting element comprises metal coated in mixed metal oxide.
- 10 14. An apparatus in accordance with claim 10 wherein the electrode comprises inherently conducting material, for example being polymeric material loaded with conducting particles.
- 15 15. A method of reducing the liquid content of a material comprising a particulate/liquid dispersion or suspension, the method comprising receiving untreated material in a receiving zone; providing at least one pair of electrodes spaced apart within the receiving zone, at least one of which comprises a textile or other synthetic material at least in part associated with a conductor so as to constitute where so associated a conducting electrokinetic textile or other synthetic material electrode; applying a potential difference thereacross and hence across the material to drive electro-kinetic dewatering; removing water thus driven to the cathode by suitable drainage means.
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- 25 16. The method of claim 15 operated to dewater the material in situ, and comprising locating the electrodes in, and thereby creating a receiving zone in situ within, a material site such as a tailings dam or lagoon or the like, and treating the material in accordance with claim 15.

17. The method of claim 15 operated as a batch process, comprising transporting untreated material to and receiving untreated material within a receiving zone in a suitable apparatus, treating the material in accordance with claim 15, and removing the treated material from the receiving zone.
18. The method of claim 15 operated as a continuous process, wherein the receiving zone comprises a treatment zone in a conduit between an input and an output thereof, and the method comprises feeding untreated material into the input, causing the material to travel therealong through the treatment zone where the above dewatering treatment in accordance with claim 15 is applied, and removing the treated material at the output.
19. The method of one of claims 15 to 18 applied a method for the treatment of inorganic mining or industrial waste and especially mine tailings by dewatering.